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ABSTRACT

This activity and record book is designed for unit 1 (ages 9-11) of the Nebraska 4-H Energy Project. In this project, members are required to: (1) use energy wisely by closing doors and turning off lights; (2) inspecting homes for energy use at least once; (3) judging the best use of lighting in a home; (4) sharing ideas about energy use in a kitchen; (5) giving at least one demonstration on reducing fossil fuel waste; (6) fixing drafts around the home; and (7) making a draft-detector for a county fair. These requirements are accomplished by completing the activities in this booklet. Activities include readings (with questions and activities related to the readings), energy games, conducting home energy inventories, fixing drafts, making a draft detector (from newspapers) to lower home heating costs, and performing simple experiments such as determining how long it takes hot water to boil in a pot with or without a lid. (Author/JN)

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the big e energy

Unit I

Member's e-Book

EC 13-15-79

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THE COOPERATIVE EXTENSION SERVICE, INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES,
UNIVERSITY OF NEBRASKA-LINCOLN, COOPERATING WITH THE COUNTIES AND THE U.S. DEPARTMENT OF AGRICULTURE
LEO E. LUCAS, DIRECTOR

Dear Parent

The 4-H Energy Project shows uses of our energy resources in ways that may save you money.

The Big e Book is designed to help your child develop understanding and skills in the wise use of energy.

Your participation in the first meeting with your child's 4-H Leader will help toward building your own family's energy chain.

Guiding your child in decision-making, locating supplies, (especially house and cooking thermometers) and discussing the kitchen experiments and home insulation should insure your child's enjoyment and completion of this project.

4-H Leader _____

Telephone # _____

CREDITS

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Your Big e Book is about energy. It is both your 4-H activity book and record book. In the 4-H Energy Project you are required to:

1. use energy wisely every day. This can be as easy as closing doors and turning off lights. Good energy habits will benefit your daily life. Often they cost no money. They can even save your family some money. They really will help your country.

2. inspect your home for energy use at least once

3. judge the best use of lighting for your home

4. share ideas about energy use in the kitchen

5. give at least one demonstration on reducing fossil fuel waste

6. fix drafts around the home

7. make a draft-detector for county fair

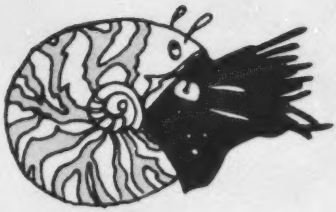
The skills that you learn and practice in 4-H will be yours for a lifetime. Plan what to learn and do on the next two pages.

Hi! I'm NAUT, a sea animal
My shell is my home. Where is your home?
Write your address on the next page.

page	ACTIVITY	PURPOSE
2	LETTERS TO PARENTS AND MEMBERS	to understand the e Project
6	WORD GAME	to learn new e-words
7	FORMS OF ENERGY	to know the forms of energy
8	FOSSIL FUELS	what fossil fuels are
10	FOSSIL FUEL USE	how they are used
11	INVENTORY OF ENERGY RESOURCES	to list renewable and non-renewable resources
12	NAUT'S SHELL WILL a-MAZE YOU!	to meet a fossil
13	HOME ENERGY INSPECTION	to become a wise e-user at home
14	THE HOLE-y HOUSE	to understand drafts
15	HOW TO FIX DRAFTS	to fix drafts
18	HOME ENERGY INVENTORY	to control house temperature
20	ENERGY FOR LIGHTING	to use lighting wisely
21	OTHER e-IDEAS	to lower your family's electric bills
22	USING GAS WISELY	to study wise gas use and develop good habits
23	KEEPING A LID ON	
24	HOW COOKS MAKE CENTS	
26	POPCORN'S ENERGY CHAIN	how popcorn is linked to energy needs
27	YOUR FAMILY'S e-CHAIN	how people are linked to energy needs
28	FOSSIE THE DRAFT-DETECTOR	to find drafts; county fair project
30	4-H EASY e GAME!	to share what you know about energy
31	LISTS OF DRAFTS TO FIX	to follow through with the Energy Project

Have a parent see and sign in the waves of each page that you do!

parent: ~~~~~~~~~~~~~~~~~~~~

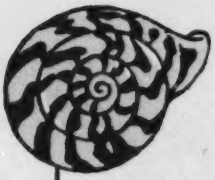


Give yourself some e's for energy effort!

I plan to read and do	Date due	I have done

WORDS TO THINK ABOUT

- energy
- energy chain
- fossil fuels
- non-renewable fuel
- caulk



WORD GAME

Some words in the e-Book are important.

EXAMPLES:

C	the energy needed to move atoms from molecule to molecule, as in fossil fuels.
cm	the useful energy found in chemical changes of raw materials.
chemical energy	short for centimeter, one part of a distance scale of 100 in the meter (.3937 inch = 1 cm).
fuel	materials spread out in the environment that need useful energy to recover or recycle them.
pollution	short for Centigrade or Celsius (a temperature scale of 100 degrees between freezing and boiling).

Word Game

Come back to this page as you learn new words. Draw a line from each word to its meaning. See how many you already know!

1. ENERGY
2. ENERGY CHAIN
3. ELECTRICITY
4. FOSSIL FUELS
5. KINETIC ENERGY
6. LEADER
7. NON-RENEWABLE FUEL
8. CHAMBER
9. SOLAR ENERGY
10. APPLIANCE
11. DRAFT
12. NATURAL GAS
13. CAULK

a. energy coming from electrons in motion (electrons are negative bundles of energy around atoms)
b. an invisible fossil fuel that is clean and easy to use, but is in limited supply
c. a room
d. a very special person who helps you learn about your family's energy needs
e. energy coming directly from the sun
f. equipment in a house that does work to make life easier
g. the ability to do work, or to make things move
h. an air leak
i. energy of moving objects — in changing speed or location
j. people and objects that are linked together and to energy to get things done
k. fuel from fossil remains of plants and animals, including petroleum, coal, natural gas, oil shale and tar sands
l. a fuel supply that may end and cannot be replaced in a million years
m. clay-like material that seals drafts

parent: _____

Forms of Energy

Everything you know contains energy in some form. Energy is invisible, except for light. You can see and feel what energy does in your daily life.

Energy is the ability to do work or to make things move. What makes a tractor work, a radio play? The rate at which energy is produced or used is called "power."

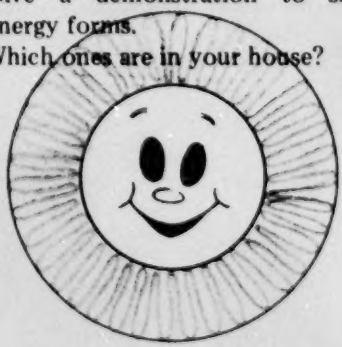
You are using energy to read this. The speed of your reading depends upon your own power. Where do you get all that energy?!!

Your body gets energy from food. The food you eat comes from animals and plants. Green plants get energy from the sun. In fact, almost everything on planet Earth gets its energy from the sun. What is the sun? It is a super hot star that sends heat and light in all directions. What are heat and light? Forms of energy, of course!!

Your body can use its own energy to move and control a bicycle. The motion of a bike depends upon mechanical energy, because bicycles are machines. When a bike is stopped at the top of a hill, it has potential energy. When you change its position by rolling it down the hill, it has kinetic (ki net'ik) energy, because the bike is moving.

Other forms of energy that we use daily are sound and electricity. Materials are held together by chemical energy. Then, energy must be all around us! How many forms of energy have you learned just on this one page? _____

Give a demonstration to show energy forms.
Which ones are in your house?



_____ _____

_____ _____

_____ _____

_____ _____

9

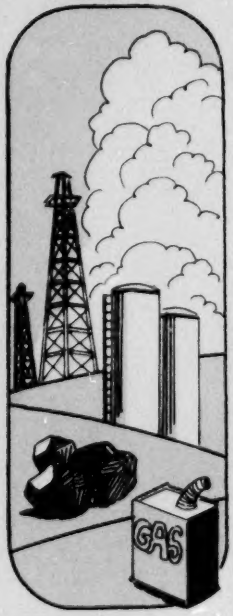
parent: _____

Fossil Fuels: Your Family's Greatest Energy Sources

You can learn: 1) how fossil fuels are used
2) why they are limited

Do you know of another way that the sun's energy is stored, besides by green plants?
It is stored underground by fossil fuels. These were formed a long time ago from dead plants and animals.

As things piled up, ocean waters moved over the material. Heat, bacteria, pressure, and weight all began to change the material into fossil fuels. We use three major fossil fuels - crude oil, natural gas, and coal.



SOLID fuel that is hard and sooty black is known as coal.

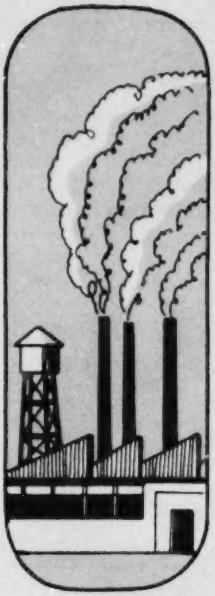
Crude oil or petroleum is a dark, thick, slick LIQUID. A third kind is invisible, but smell is added to it. Can you name it? _____

During this century people became dependent upon fossil fuels to heat their buildings, cook their food, heat water, and to move their cars, trucks, planes and other machines.

Coal was used to generate electricity and manufacture iron and steel products. Chemists discovered its usefulness in nylons and paints.

Natural gas became an easy-to-get, clean fuel for cooking and heating. It became important for making medicines, bug killers, and fertilizers.

parent: _____



Many products come from crude oil, or petroleum, such as asphalt for roads and roofs, plastics for toys, clothes, even sandwich bags. Detergents and cosmetics are also made from crude oil.
With all the wonderful products made from just three fossil fuels came two major problems—

1) POLLUTION because our energy never leaves Earth, it may change form, sometimes leaving unpleasant by-products, or leftovers.
2) SHORTAGES because fossil fuels cannot be renewed or replaced in a million years! They are nonrenewable.

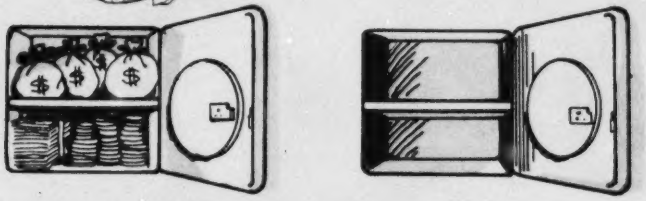
Write or tell a story about what your neighborhood would be like without fossil fuels. SHARE YOUR STORY WITH 4-H MEMBERS!

Fossil Fuel Use

What happens to the fossil fuels that we use?

When you save money, is it put into a bank? Pretend that fossil fuels are stored like family valuables in underground vaults. If you take out the family valuables and spend or use them up, are they gone forever?

YES _____ NO _____



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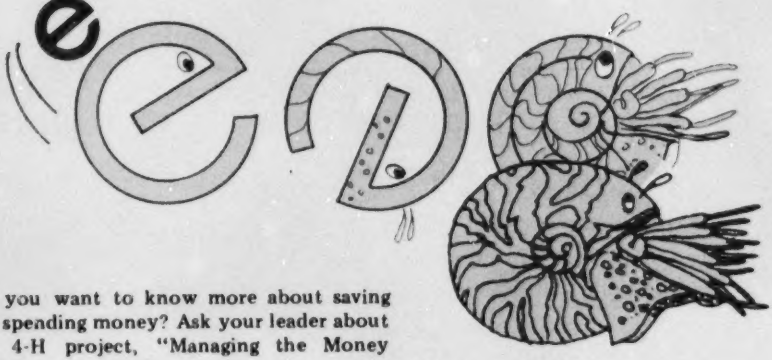
If the supply of oil, gas, and coal runs out, where will Americans turn for more? _____

_____

The United States has been buying oil from other nations. This affects world prices of goods. People say, "Everything costs too much." Will there be any fossil fuels left "in the vault" by 2000 A.D.?

People are problem solvers. Americans like to face challenges. Which families will spend energy resources wisely? Which will be wasteful? Being careful energy users will help to keep our resources longer, while we look for more unlimited resources.

Unspent fossil fuels save us time and money. TIME to develop new resources. MONEY to spend for new developments. You can help your family to use energy wisely. Give a demonstration about saving fossil fuels.



Do you want to know more about saving and spending money? Ask your leader about the 4-H project, "Managing the Money Maze".

parent: _____

Inventory of Energy Resources

An inventory is a list. A resource is a source of supply. Make a list of energy resources. Remember, fossil fuels are non-renewable resources (see page 10). So is uranium, a fuel for nuclear reactors. Coal is the only non-renewable fuel that is plentiful. But, its pollution problems need time to be solved.

Renewable energy resources can be replaced. For example, wood can be renewed by tree growth.

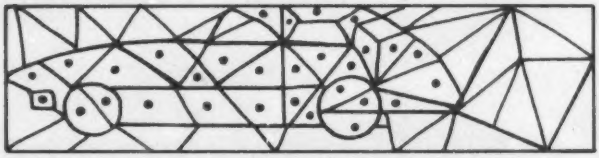
How many energy resources do you know? Add to the lists below. Have someone check your list.

NON-RENEWABLE ENERGY RESOURCES	RENEWABLE ENERGY RESOURCES
crude oil (petroleum)	wood
tar sands	plants
	geothermal (Earth heat)

Now go back and circle the resources that are plentiful near your home!

Almost all the energy your family uses is supplied by fossil fuels. The two biggest energy users in your family are hidden on this page. Can you find them?

1. Color in the dotted areas of the puzzle.



2. Hold this bottom side up in front of a mirror!

HOME HEATING
AND COOLING

Write down ways to slow fossil fuel spending with automobiles. For instance, run three errands in one short trip. (Once a bicycle is made, it uses no fossil fuels except a few drops of oil.)

Ask your leader about the Automobile, Tractor, and the Bicycle Safety Projects in 4-H. These may help you to become a better energy user.

parent: ~~~~~~~~~~~~~~~~

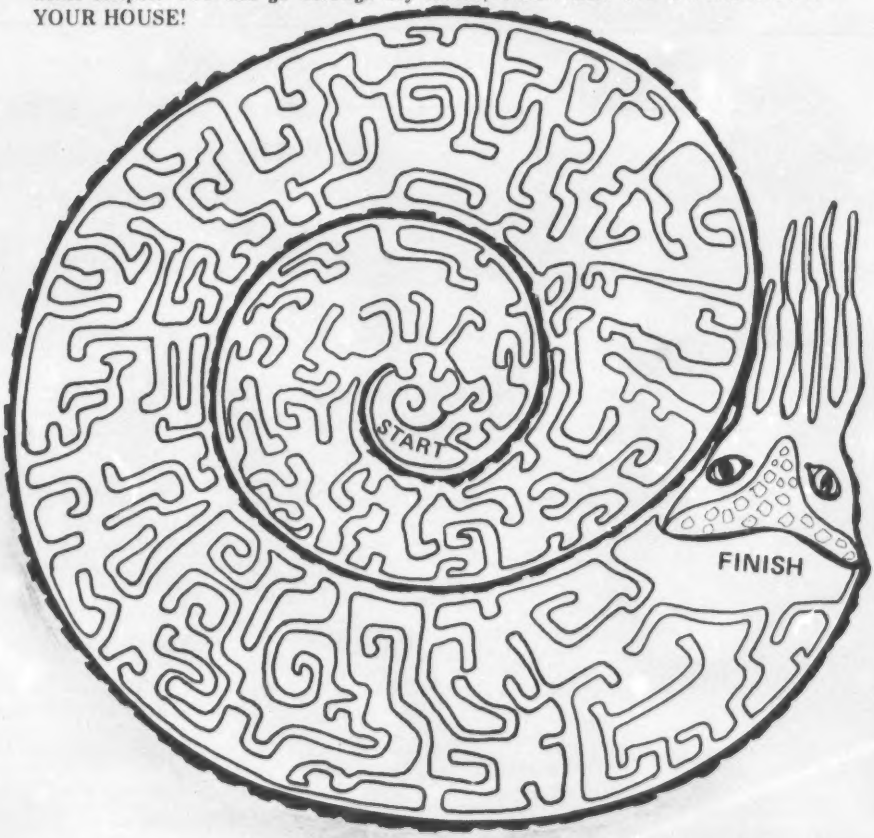
Naut's Shell Will a-Maze You!

My ancestors are fossils. They were sea animals called *ammonites.* They lived 180 million years ago, before dinosaurs.

Today I'm known as a *chambered nautilus* (NAWT'ill us). I have two like a : I can swim backwards in the deep .

My can grow to 8 inches (20 cm). It started from a tiny room. As I grew, I closed off the little room with a wall, or *septum.* Each time that my tongue-shaped body grew, I build a new, larger room to move into.

Follow my growth path through my spiral shell. Color my with orange and white stripes. You can go through my house, THEN LET ME GO THROUGH YOUR HOUSE!



My house makes good use of energy. Rooms, called chambers, that are not used are closed. My home is sealed from air and water leaks. I never waste energy.

How is your house doing? Let's be inspectors. Get a flashlight, ruler, and pencil and this book. Invite an adult on our —

Home Energy Inventory

	YES	NO
How many rooms are used in the winter?_____		
Are unused heating, cooling vents closed? Use the flashlight.	____	____
Are doors* to unused rooms closed?	____	____
Are small rugs stuffed under these doors?	____	____
*Homes with heat pumps should keep vents open to prevent harm to pumps.		
Are attic and basement doors tightly closed?	____	____
Is there a crawl space instead of an attic?	____	____
Is there insulation material under the floor in the ceiling?	____	____
(Insulation protects against heat loss.) Use the flashlight.		
How thick is the insulation? Use the ruler: _____		
Are there roof vents or holes to the outside to let moist air or summer heat escape?	____	____
Does the house* have a basement?	____	____
Is it heated?	____	____
Does the ceiling have insulation? Check this with the flashlight.	____	____
*If you live in a trailer home, is there a skirt around the bottom of the trailer?		
Is there a clothes dryer?	____	____
Does it have an outside vent to get ride of moist air?	____	____
Is there a freezer in the house?	____	____
How thick is the frost? Use the ruler: _____		
Does the freezer need defrosting [is the frost ¼" (6.4 mm) thick or more]?	____	____
Is there a refrigerator and oven in the house?	____	____
Shut their doors on a dollar bill. Does the money pull out of the doors easily?	____	____
If yes, the door seals are leaking energy. A leaky door will need a new seal called a gasket.		

LOOK AT YOUR LIST. WHAT NEEDS TO BE FIXED? WRITE IT DOWN ON THE LIST BELOW.

_____ _____

_____ _____

_____ _____

parent: ~~~~~~~~~~~~~~~~

The Hole-y House

Every house loses some heat in winter and coolness in summer. Heat is always leaving and entering through "holes" in the house.

Look for "holes" in your house:

open windows and doors (That's okay when the furnace or air conditioner is off.)
cracks under doors
cracks between window glass and frames
outside cracks around the house
chimney flues and fireplace vents
— and many more! If you add up all of these openings and cracks, they make a hole that is bigger than you!

Air that enters these holes is called a draft.

Do you want a drafty home?
YES___ NO ____
WHY? _____

_____

Let's make a DRAFT-DETECTOR!

MATERIALS:
clothes hanger or pencil
piece of tissue paper
pins or tape
scissors

parent: _____

METHOD: Cut the paper to fit the length of the hanger or pencil. Tape or clip the paper to the hanger or pencil.

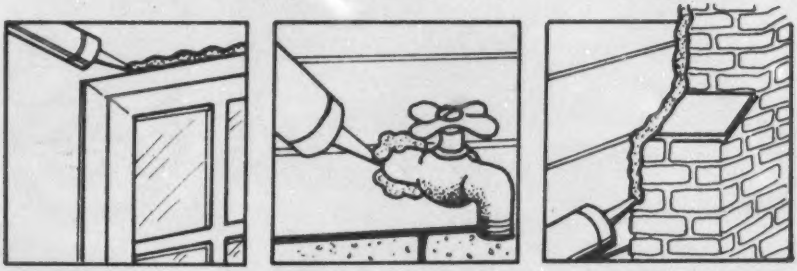
HOW TO USE: Hold the detector in front of a suspected house hole or crack. If the air is leaking in, the paper will move. You have detected a draft.

Keep a record of the drafts to fix on page 37.

Give a demonstration from this page about drafts.

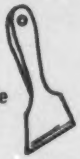
How to Fix Drafts

1. CAULKING



around windows | outside pipes | where two different materials meet

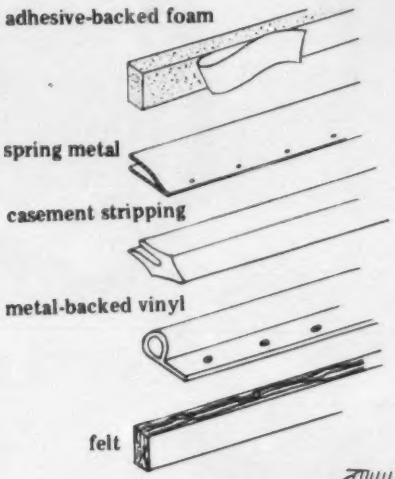
2. WINDOW PUTTY

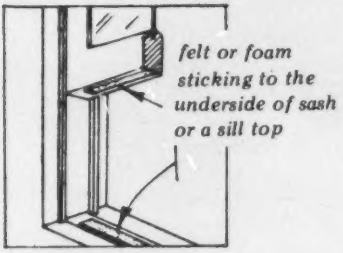


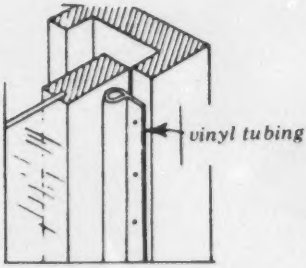
can of window glazing putty

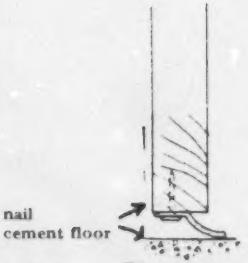
all around glass where it meets the window frame

3. WEATHER-STRIPPING

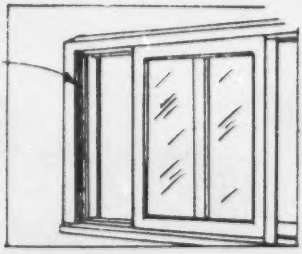








garage door sweep



sliding window

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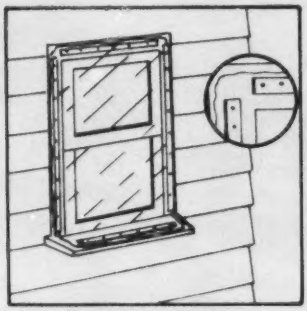
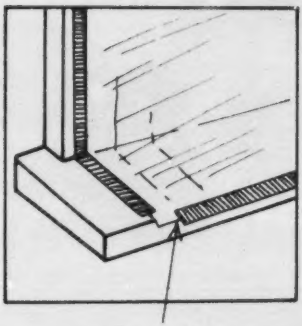
4. STORM WINDOWS

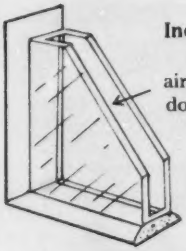


Outside

to hold plastic against window frame, tack on *slats*, or wood strips

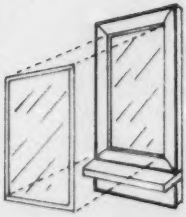


use duct tape to secure plastic to window frame

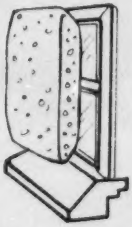


Indoors

air pocket inside a double glazed window

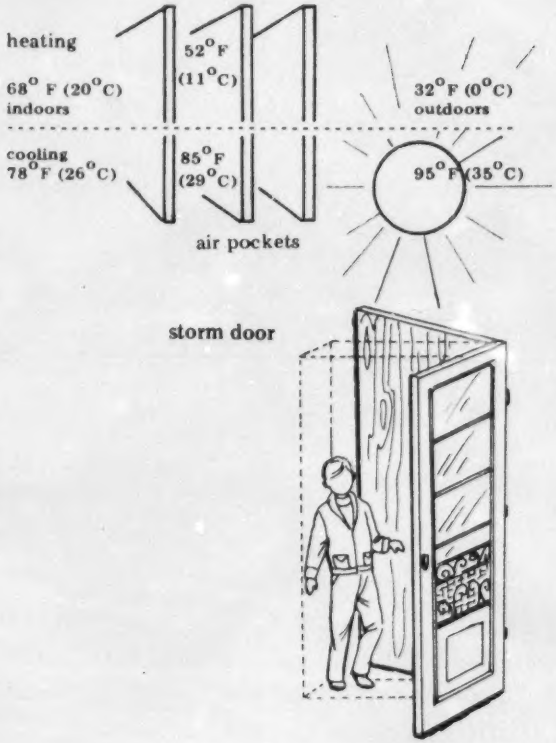


single glazed window with indoor storm of stiff plastic



basement single glazed window with inexpensive styrofoam bead board cut to fit snugly

triple glazed window effect



5. STORM DOORS

Windows and doors act as house "holes". They make the furnace and air conditioner work harder. If air is trapped between them, an air pocket is formed. These air pockets reduce heating and cooling energy loss from indoors to outdoors.

Do pockets in your sweater or coat help to keep your hands warm in winter? YES _____ NO _____

GIVE A DEMONSTRATION ON HOW TO USE ONE OF THESE DRAFT-FIXING IDEAS!

parent: _____

20

HOME ENERGY INVENTORY

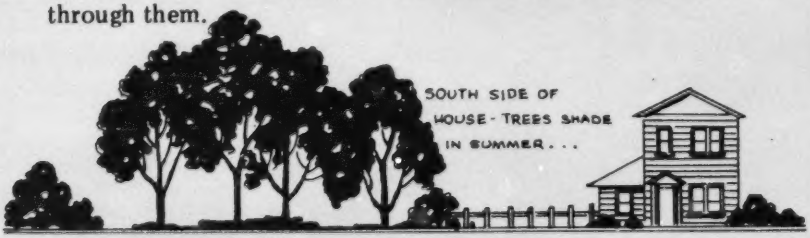
Let's go through the house again. First, we will take a temperature of your house. Put a thermometer next to the thermostat (furnace control dial). Leave it. We'll come back to it later.

	YES	NO
Check the thermostat.		
Is it set at 68°F (20°C)?	____	____
If no, what ____°?		
Do you wear warm clothing in the house in winter?	____	____
Is the thermostat lowered on winter nights?	____	____
What ____° temperature at night?		
Do you sleep under extra blankets?	____	____
In summer, is the house air conditioned?	____	____
If yes, is the thermostat around 78°F (26°C)?	____	____
Is the air conditioner shut off at night?	____	____
Are windows opened on summer nights?	____	____
Are doors and windows left open when the air conditioner is on?	____	____
Do you know how to close draperies and shades in your house?	____	____
Are they closed in summer when the sun shines in?	____	____
Do you have awnings?	____	____

What trees are on the south side of your home? _____

_____

Trees that drop their leaves are deciduous. In the summer they give shade to the south side of a building. In winter, sun shines through them.



parent: _____

Houses with
fevers and chills
May raise heating
and cooling bills!

	YES	NO
Are draperies opened in winter where the sun shines in?	___	___
Are they closed in winter as soon as the sun goes down?	___	___
Do you have built-in house fans in the		
kitchen?	___	___
bath?	___	___
workroom?	___	___
Are fans left on for more than 10 minutes? (In an hour they could empty one house full of heated or cooled air!)	___	___
Did someone inspect the furnace or heat pump in the last year?	___	___
Are furnace filters changed once a month in winter?	___	___
Is the gas furnace pilot light shut off in the summer?	___	___

Let's go back to the thermometer now.

Write its temperature here ____°.

Check the thermostat. Are the two temperatures different?	___	___
If yes, have an adult fix the thermostat.	___	___

parent: ~~~~~~~~~~~~~~~~~~~~

HOW MANY WORDS CAN YOU MAKE FROM THE LETTERS IN

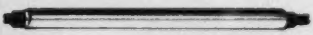
SAVE FOSSIL FUELS

Energy for Lighting

We've been working with a form of energy in your home that you can feel — heat. Now let's look at energy we can see — light. We've seen how sunlight through windows gives both heat and light. What other form of energy lights your home? _____

Two types of electric lighting are useful in your home:

1. FLOURESCENT LIGHT TUBES give a lot of bright light to get work done. Can you name some work areas in your home? _____



_____

_____

For wise e-use, these tubes are best where you need lighting for more than 15 minutes. In the long run their e-use is lowest. But flicking these switches on and off quickly may waste money.

parent: _____

2. INCANDESCENT BULBS are hot and give heat. Their colors make dining rooms and living rooms look cozy. A 60-watt regular incandescent bulb uses less energy than a 100-watt bulb. (A watt measures the energy needed to light a bulb.) But a 100-watt bulb is better than two 60-watt bulbs in the same area!

Let's count the flourescent tubes in your house.

number:
size:

Up to half of the cost of lighting a home can be turned into savings. You can help. It's easy!

1. When you awake, plan to get things done in natural daylight, including reading.
2. Turn off lights not being used.
3. To get the best light from each bulb in a lamp, dust them every week. Ask for your own dust cloth for lamps. Do you have one? YES___ NO___

Have you ever counted the different incandescent bulbs in your home?

INCANDESCENT BULBS

Number of watts	2-4 watts	5-19	20-40	50-60	75	100	over 100
Number of bulbs							

TOTAL number of incandescent bulbs _____

List the areas in your home that could use smaller bulbs (60 watts or less)

_____

_____

parent: _____

Other e-Ideas

To save even more money with lighting . . .

Remember that lights in the center of a room are less useful than those near the walls, where you need good lighting for activities and for stairs.

Light colors on ceilings and walls save you energy and money! They reflect light back to you, while dark colors absorb light that you pay for.

Ask parents to use timers or photocells when leaving lights on for security or vacations.

Light switch controls called solid-state dimmers are easy to install for many types of bulbs. If used regularly, they save energy and extend the life of all types of bulbs.

Eat dinner by candlelight!

Replace old higher watt bulbs with bright new lower watt lights. They could cut energy use in half.

Give yourself an **e** for every day that you rememberd to shut off lights that were wasting energy. Keep a record on the chart for a month. Start with your own room!

MONTH _____

DAY

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31									

If you "switched off" every day, think of the money you'd save in a lifetime!

Interested in electricity? Then ask about the 4-H Electricity Project . . . to help you through the Energy Project.

parent: 24

Using Gas Wisely

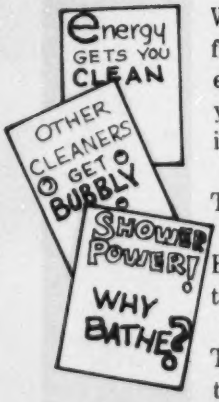
How is gas wasted?

Natural gas and propane have been used widely to heat homes and water. A large amount of gas is burned by pilot lights that stay lit 24 hours a day. Special shut-off and starter devices are being developed for gas pilot lights, and solar water heaters may someday replace these. In the meantime, you can . . .

Keep hot water heaters on warm instead of hot. Check the temperature by putting a cooking thermometer in a cup of hot tap water. If the temperature rises above 150°F (66°C), you are wasting fuel! Keep the temperature between 110°F (43°C) and 140°F (60°C).

Hot water should not keep running while you are washing dishes by hand. Rinse all dishes together.

If you have an automatic dishwasher, make sure it's full before you turn it on. Learn to run a dishwasher during hours of low electric use, such as at night. In the summer, if you turn clothes or dish washers on before bedtime, or after awaking, the house will stay cool, too.



Watch for dripping faucets. Take time to shut off faucets properly. If you discover that one is leaking even while shut off, tell a parent. Ask an adult, such as your 4-H leader, about replacing old washer rings inside your faucets.

Take short showers instead of long baths.

Become the LATHER LEADER in your house! Get in the habit of turning off the shower when you soap up.

Think up some small posters to put in every bathroom to remind everyone to use less hot water.

How long does it take you to shower? _____ minutes

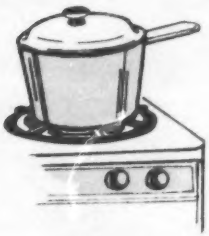
to shower after soaping up? _____ minutes

to bathe? _____ minutes

Keeping a Lid On

To detect energy waste in the kitchen, the following experiments can be seen best with a gas stove. Electric stoves will work, too. Two equal size stove burners are needed. Ask an adult to help.

First, gather your supplies for both experiments:



one stove
two pots of the same size, one with a tight lid
water
cup measure
clock
2 eggs

1 pot holder to protect hands from heat
permanent ink marker

EXPERIMENT I: HOW LONG DOES IT TAKE HOT WATER TO BOIL IN A POT WITH A LID? WITHOUT A LID?

METHOD: Using the high heat setting, heat up two burners of equal size on the stove. Place two cups of cold water in each pot. Cover one pot tightly. Place the pots on the burners at the same time. Start timing immediately. How long did it take the water to reach a rapid boil? Which water came to a boil the fastest?

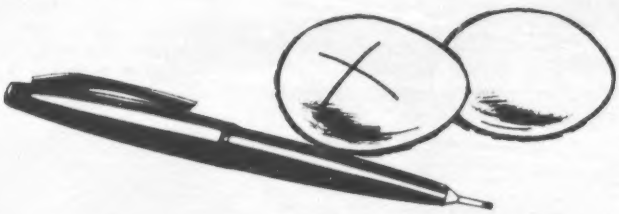
Do the experiment again, but this time use the lowest heat setting for the burners. How long did it take the water to boil this time? Which water came to a boil first?

parent: ~~~~~~~~~~~~~~~~~~~~

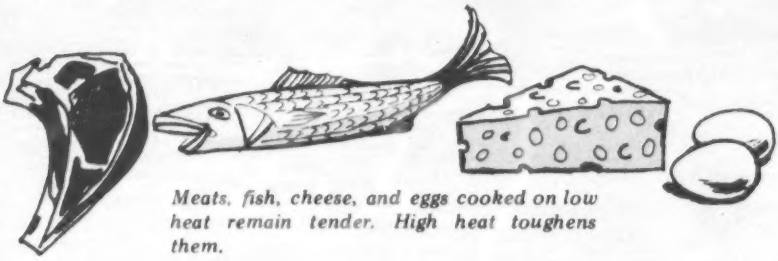
	slowest	fastest
high heat		
low heat		

EXPERIMENT II: HOW FAST WILL EGGS COOK OVER HIGH AND LOW HEAT?

METHOD: Start with cold water again. Mark one egg with permanent ink. Add one egg to each pot. Leave both pots uncovered. Place both pots on burners at the same time. Bring both pots to a bubbly boil on high heat. Lower the burner for the pot with the marked egg to simmer. After 5 minutes, remove, cool and peel the eggs. Is one egg cooked more than the other?



	more cooked	same	less cooked
egg with mark (simmered)			
egg cooked on high heat			



Meats, fish, cheese, and eggs cooked on low heat remain tender. High heat toughens them.

How Cooks Make Cents

Saving energy in the kitchen makes cooking more fun! Here's how . . .

1. Save YOUR energy. Get together all supplies first. Then plan your steps. You'll save time, too.

2. High heat wastes energy. Cooking may start on high heat, but in a minute turn the heat down to the lowest possible setting. Continue cooking on simmer.

3. A cover to fit the pot is the best way to cook. Heat will continue to cook food for 5 minutes after the burner is turned off. Turn off burners 5 minutes before a recipe says so. That's 5 minutes of FREE energy!

Your kitchen is a good place to try out e-ideas. How does your family use energy wisely?
For instance, is the oven turned off 30 minutes before food has finished cooking for more free energy? YES___ NO___

Are small appliances used in place of the oven when they could use less time and energy? YES____ NO____

Write down your family's e-ideas here:

SHARE YOUR FAMILY'S IDEAS!

Does your family cook together sometimes? You may want to plan a special energy-saving cooking activity with your family. Ask your leader about the 4-H Project and Home Economics NebGuide, "Building Family Strengths." These may help you to plan five happy meetings with your kin!

Cooks who buy fresh fruits and vegetables usually pay less for them because less fuel energy is used than for:

canned foods

frozen foods
(more energy needed)

For instance, cooking time for corn is about the same — 5 minutes — whether it's fresh (on the cob*), canned, or frozen. But more energy is needed to freeze corn and to keep it frozen, than if it just came fresh to you.

It takes a lot of energy to make the packages that hold the canned and frozen corn, too! Remember, plastic bags are also made from fossil fuels. And, energy is used to make the cans.

Can you think of other ways that energy is used to get the corn to your table?

_____

_____

_____

shopping trip with the family car _____

making the car costs energy too! _____

*The cob on fresh corn doesn't need to be cooked, because it isn't eaten. Overcooking fresh corn loses its tenderness and sweet flavor.

Do you like to cook? YES ____ NO ____ You can try out your energy ideas in many 4-H Cooking projects! Ask your leader or county Extension agent.

parent: ~~~~~~~~~~~~~~

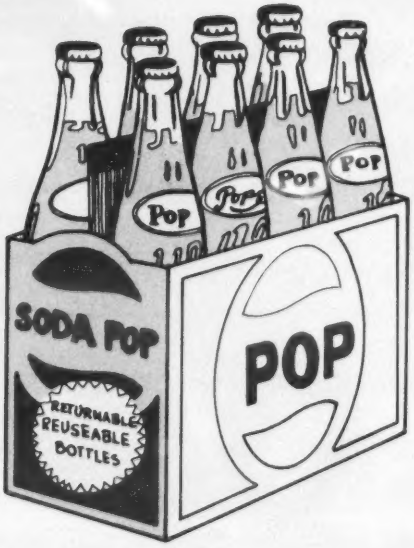
How would YOU save energy when shopping for fruits and vegetables? Write here:

Another ♻ – idea!

If you drink soda pop, do you use bottles or cans? _____

What happens to them when they are empty? _____
Returnable soda pop bottles can be reused 10-15 times. What kind of container for soda pop are you going to look for the next time you shop? _____

_____



parent: ~~~~~~~~~~~~~~

Popcorn's Energy Chain

Shucks! Nautiluses can't eat popcorn!!

!!POP!! Wouldn't it be fun to invent a solar popcorn popper?!!

You have learned that almost all energy comes from the sun. But can you eat a sun ray? No, but the sun gives energy *indirectly* to your body, through green plants, which change solar energy into chemical energy. So far, green plants do the best job of *storing* the sun's energy on Earth.

Think about popcorn. It begins in a green plant that needs a lot of energy. Can you think of all the ways that energy is needed to get the popcorn from its green plant to your snack bowl?

SEE IF YOU CAN FINISH THIS POPCORN ENERGY CHAIN.

Ask your leader what is inside a popcorn seed that helps to make it pop!

ANSWER:

you fill in the rest of the story!!

Sun's energy

energy to make the farm equipment

energy for machines to plant corn seed

sun's energy to grow corn

irrigation for the corn fields

energy to make and haul bug killers and fertilizers

equipment to harvest the corn

energy to dry the corn

machines to move the corn to makers of corn products

energy to run machines that make corn products

equipment to make packages for popcorn

energy to move the corn to the store

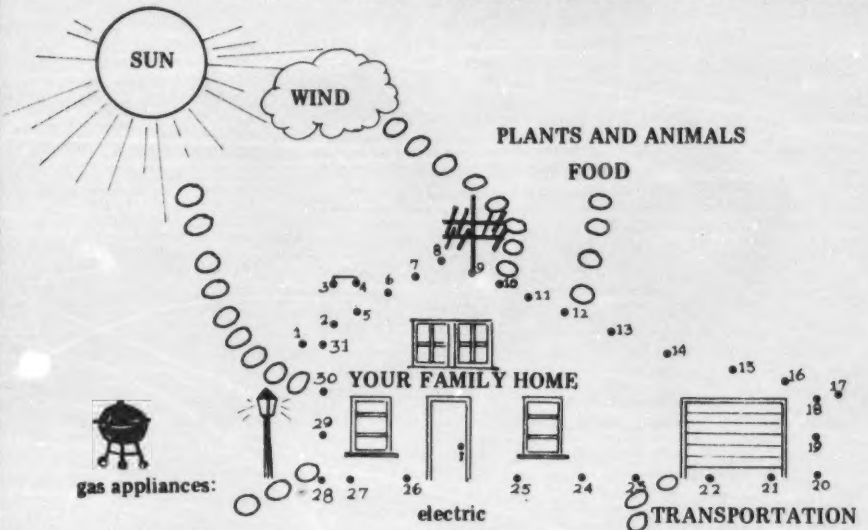
your energy to open the popcorn package

energy to drive the car to the store and home again

parent:

Your Family's e-Chain

Your family is linked to energy in its own special way. Finish the picture. Circle the things that your family uses most often. Add to it things that are important to you (your favorite foods, toys, appliances you use the most). You can make a bigger picture or 3-D model, too!



gas appliances:

_____

_____

_____

_____

electric appliances:

_____

_____

_____

_____

car
bus
motorcycle
other _____

PRODUCTS:
paints
plastics
detergents
other _____

_____

_____

INDUSTRY:
to make products

OTHER PLACES:
school
church
work
stores
offices (dentist, doctor)

FOSSIL FUELS

DRAW A PICTURE OF ALL THE ENERGY ACTIVITIES INSIDE YOUR HOUSE OR GIVE A DEMONSTRATION.

parent: _____

How can you lower home heating costs?

You can make a draft-detector out of a dinosaur! Its name is Brontosaurus Fossil, or "Fossie" for short. Fossie tests for drafts around windows, doors, and even fireplace openings. Hold its body and point its tail near a crack or opening. If the plastic strip on the tail moves back and forth, Fossie has detected an air leak or draft.

Fossie's tail is handy for storing weather stripping, and sealing and caulking supplies. Just take Fossie around the house, check the plastic strip for drafts, and fix them on the spot.

SAFETY TIP: Keep Fossie away from fans, flames and near doors where people might trip on it.

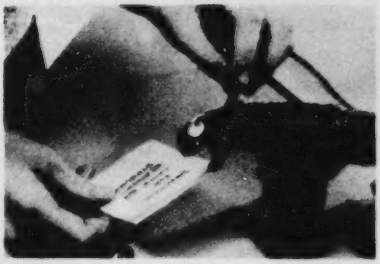
MATERIALS: 3 newspaper double pages
masking tape
medium-thick yarn: 1 or 2 colors
white glue
scissors
white tape or cloth for eyeballs
black marking pen for eye dots
transparent, smooth, plastic sandwich bag
cellophane tape
assorted weather stripping and caulking
file card and pen

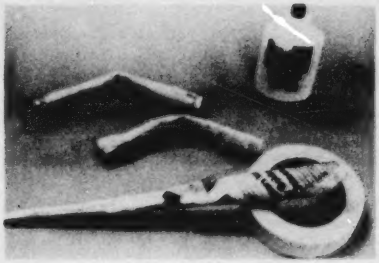
HOW TO MAKE FOSSIE:

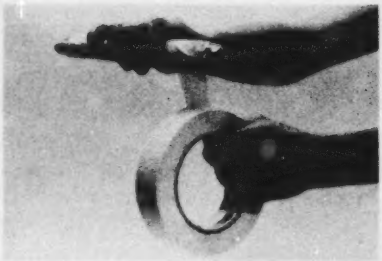
1. *ROLL NEWSPAPERS* to make body (2 sheets rolled diagonally from one corner) and legs (1 folded roll = 2 legs. For each, fold 1 page twice, roll from short edge).
2. *TAPE* newspaper rolls tightly. Fold each leg roll in half to make 2 legs.
3. *GLUE HALF OF BODY.* Wind yarn to halfway. Glue remaining half and finish winding yarn. Cover legs with yarn in same way.
4. *ATTACH* centers of folded legs to underside of body with yarn. Glue the body as yarn is wound. Criss-cross the yarn at top of body. Wind around body and leg 10 times, or until it holds tightly.
5. *ADD DETAILS* to yarn-wrapped dinosaur. Add eyes of felt or stick-on tape. Cut open a plastic sandwich bag and tape it to Fossie's tail for a draft-detector. The lighter the bag, the better it moves in drafts! Slide some rolls of caulk and weather stripping onto the tail.

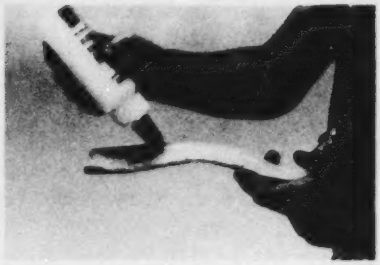
Fold a file card in half and punch a hole in it. Write on it the directions for using Fossie's draft-fixing supplies. Attach a piece of yarn to the card (thread it through the hole) and tie it securely around Fossie's neck.

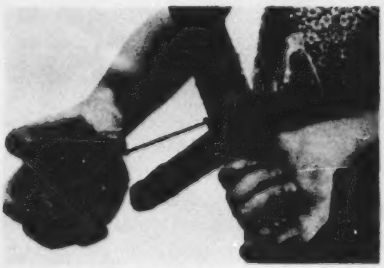
HOW TO MAKE FOSSIE the Draft-Detector











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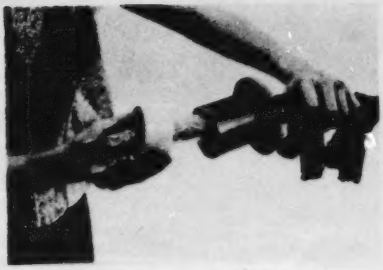
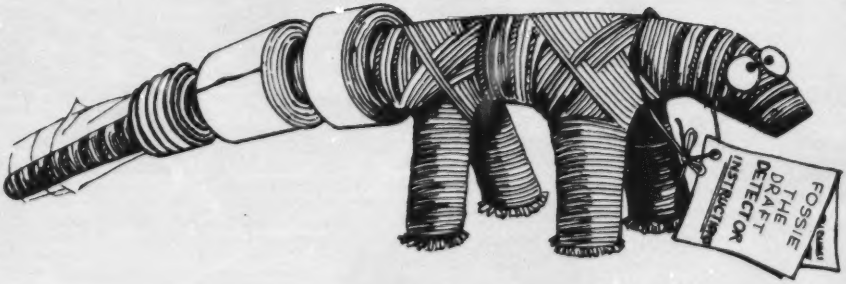



FOSSIE
THE
DRAFT
DETECTOR
INSTRUCTIONS

CHECKLIST FOR JUDGING YOUR FINISHED FOSSIE

DESIGN: simple__ interesting__ stands up__ tight, strong tail ___

SIZE: about 15" (38 cm) long___ about 4" (10 cm) high_____
sturdy legs, at least width of thumb_____
tail about half of total length, for supplies _____

SUPPLIES: file card instructions written clearly (how to use supplies)____
file card tied securely around neck_____
supplies coiled neatly around tail___ supplies won't fall off_____
quantity and quality of supplies important (duct tape and elastomeric based weather stripping are best quality sealants)_____
both weather stripping and caulking on tail _____

WORKMANSHIP: neat in appearance (especially where legs connect to body)_____
nicely decorated – good colors _____

When you finish this e-Book, you will be ready for Unit II. It has more information about bikes and cars as well as energy resource alternatives – sun, wind, nuclear, biomass and much more!

gimme gas monster

What is Nebraska's state speed limit? _____ m.p.h. (miles per hour). Write the answer in the sign.

parent: ~~~~~~~~~~~~~~~~~~~~

Has your parent signed the pages in your e-Book?

List of Drafts to Fix

Wait for a windy or cold day. Take your draft-detector around the house. Let's start at the top of the house and work our way down.

attic floors
holes cut for wires and pipes
door to crawl space
ceiling holes for exhaust fans
electric wall outlet cracks
fireplaces and dampers
sliding glass doors (keep tracks dirt-free)
door bottoms and sides
mail slots (oil the hinges)
garage doors
windows
outdoor light bases on walls
around water pipes
open heating ducts in crawl spaces
basement doors
basement ceiling holes for wires, pipes
basement windows - fix broken ones - cover single glazed ones with shutters or plastic storm windows

parent: _____

4-H EASY e-GAME RULES

TEACH A YOUNGER PERSON ABOUT CAREFUL ENERGY USE HABITS!

AIM: First one to get the reward at the end of the e-path is the winner — THE BIG e WISE USER!

RULES OF PLAY: Any number of people can play. Every player needs a penny to use as a marker. Place the penny on the spiral center at "start". Take turns. If two pennies get on one space, stack them!

Throw one dice. Count the dots on the dice. Move that number of spaces on the board. On whatever space you land, do what it tells you. Beware of all those monsters that gobble up energy!

The real winners are 4-H members who know the most about using energy wisely.

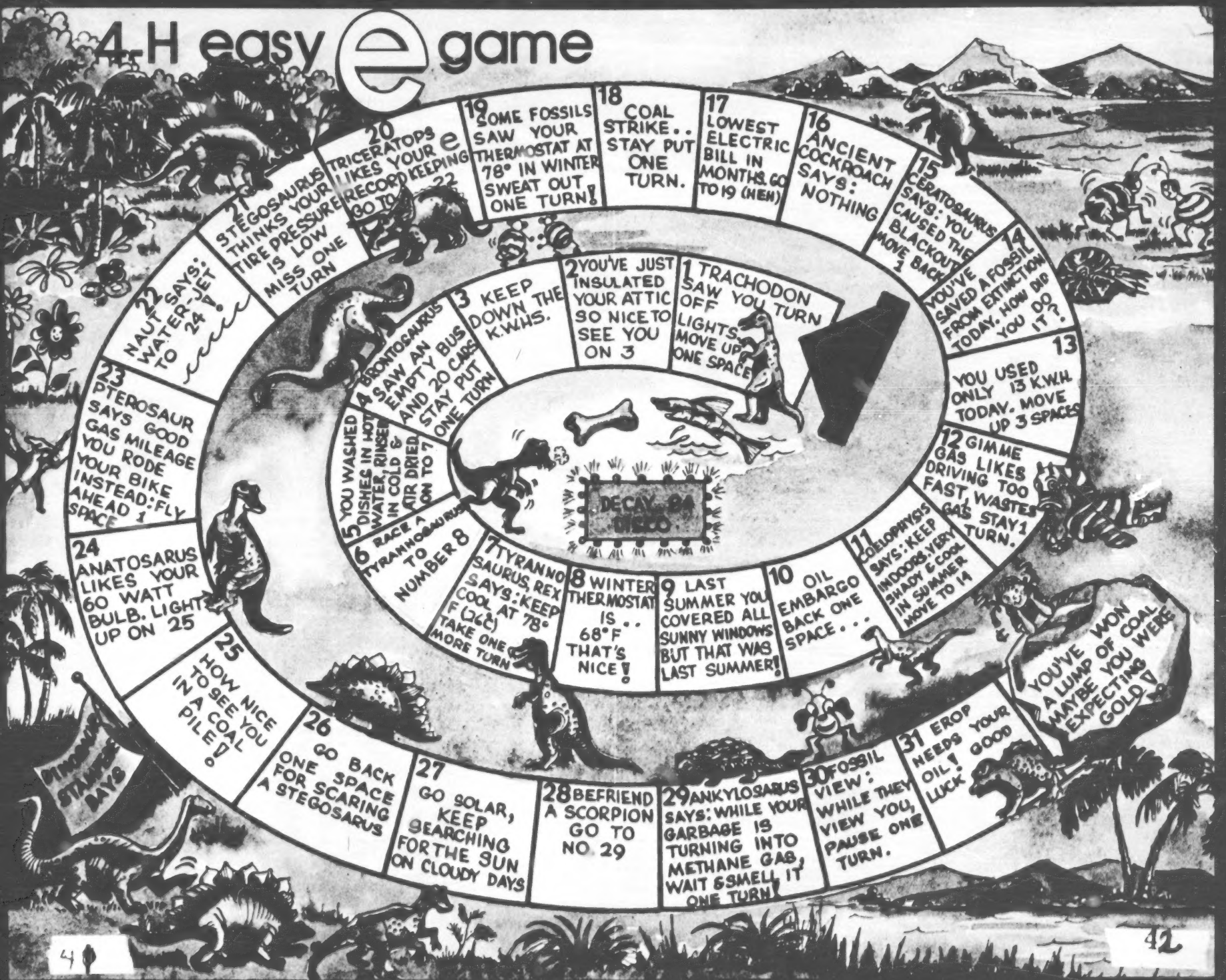
I,_____, will make every effort to protect my home against energy waste. I will be an alert energy user every day.

(signed)_____

4-H Club_____

witnesses_____
(parent)

_____
(leader)


4-H easy e game
1 TRACHODON SAW YOU TURN OFF LIGHTS. MOVE UP ONE SPACE
2 YOU'VE JUST INSULATED YOUR ATTIC SO NICE TO SEE YOU ON 3
3 KEEP DOWN THE K.W.H.S.
4 BRONTOSAURUS SAW AN EMPTY BUS AND 20 CARS STAY PUT ONE TURN
5 YOU WASHED DISHES IN HOT WATER, RINSED IN COLD & AIR DRIED ON TO 7
6 RACE A TYRANNOSAURUS TO NUMBER 8
7 TYRANNOSAURUS REX SAYS: KEEP COOL AT 78° F (26C) TAKE ONE MORE TURN
8 WINTER THERMOSTAT IS .. 68°F THAT'S NICE!
9 LAST SUMMER YOU COVERED ALL SUNNY WINDOWS BUT THAT WAS LAST SUMMER!
10 OIL EMBARGO BACK ONE SPACE . . .
11 COELOPHYSIS SAYS: KEEP INDOORS VERY SHADY & COOL IN SUMMER. MOVE TO 14
12 GIMME GAS LIKES DRIVING TOO FAST, WASTES GAS STAY 1 TURN.
13 YOU USED ONLY 13 K.W.H. TODAY. MOVE UP 3 SPACES
14 YOU'VE SAVED A FOSSIL FROM EXTINCTION TODAY. HOW DID YOU DO IT?
15 CERATOSAURUS SAYS: YOU CAUSED THE BLACKOUT MOVE BACK 1
16 ANCIENT COCKROACH SAYS: NOTHING
17 LOWEST ELECTRIC BILL IN MONTHS. GO TO 19 (HEH)
18 COAL STRIKE.. STAY PUT ONE TURN.
19 SOME FOSSILS SAW YOUR THERMOSTAT AT 78° IN WINTER SWEAT OUT ONE TURN!
20 TRICERATOPS LIKES YOUR RECORD KEEPING GO TO 22
21 STEGOSAURUS THINKS YOUR TIRE PRESSURE IS LOW MISS ONE TURN
22 NAUT SAYS: WATER-JET TO 24!
23 PTEROSAUR SAYS GOOD GAS MILEAGE YOU RODE YOUR BIKE INSTEAD: FLY AHEAD 1 SPACE
24 ANATOSARUS LIKES YOUR 60 WATT BULB. LIGHT UP ON 25
25 HOW NICE TO SEE YOU IN A COAL PILE!
26 GO BACK ONE SPACE FOR SCARING A STEGOSAURUS
27 GO SOLAR, KEEP SEARCHING FOR THE SUN ON CLOUDY DAYS
28 BEFRIEND A SCORPION GO TO NO. 29
29 ANKYLOSAURUS SAYS: WHILE YOUR GARBAGE IS TURNING INTO METHANE GAS, WAIT & SMELL IT ONE TURN!
30 FOSSIL VIEW: WHILE THEY VIEW YOU, PAUSE ONE TURN.
31 EROP NEEDS YOUR OIL! GOOD LUCK
YOU'VE WON A LUMP OF COAL MAYBE YOU WERE EXPECTING GOLD!
DECAY 84 DISCO
DINOSAUR STAMPEDE PLAYS